

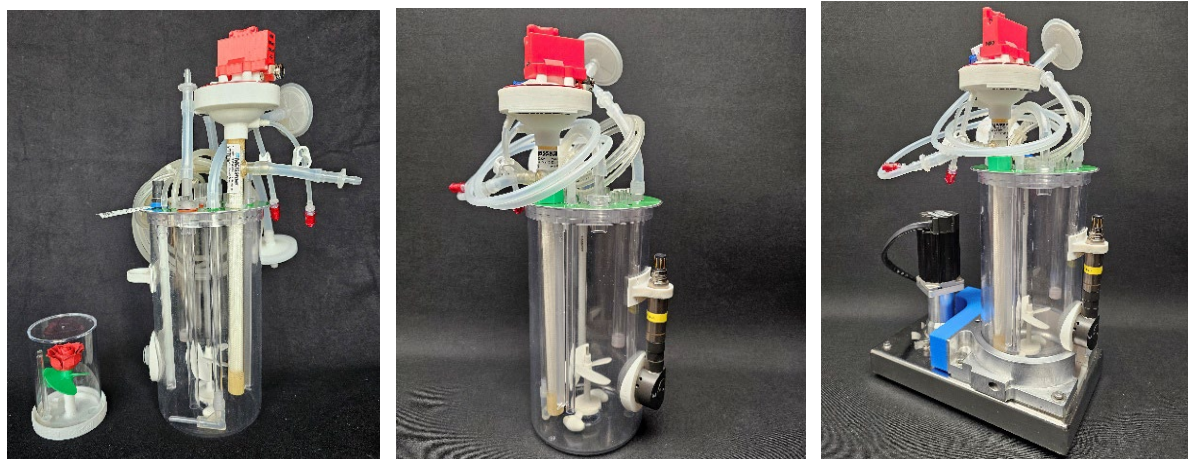
TOP text 0.4 – 2.5 liter Working Volume ATF Perfusion-SUB

2nd line text **SUBmerged™ P-SUB clear HFF from fouling**

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- Revolutionizing **CellRetention-3** SUBmerge SepraPor® HFF (Hollow-Fiber-Filter) directly into the SUB broth eliminating dead volume
- Direct coupled HFF with inverted Thalia TM80 diaphragm Single-Use-Pump reduces shear stress, eliminates cell accumulation and clear well-known HFF fouling



Left photo - The re-invented 3 liter P-SUB with SUBmerged SepraPor C112 and inverted Thalia TM80S with red LASER support on top. Centre photo - The InCyte biomass SUS patch mounted on the vessel wall and InCyte ARC sensor clicked on. Right photo - 3 liter P-SUB mounted in the Heating-Support-Foot (HSF) on the Magnetic-Stirrer-Table (MST). Reason is simple – there is not space for both servo motor, sensors and Thalia TM80S on the OD137 mm head plate so Magnetic-Bottom-Drive (MBD) is the smart option.

Inside the P-SUB

- Agitation by OD 65 mm pitch blade impeller, super-efficient 25 µm pore glass micro sparger for high cell density, deep-tubes, addition, harvest, baffles, etc – see doc at download
- SepraPor XFCM20C112-xx1x HFF (Hollow-Fibre-Filter) with 420 cm² surface and HFF inlet **SUBmerged** directly into the broth
- Single-Use-Sensors (SUS) for DO, pH, bio-mass, temp, level as needed

Outside the P-SUB

- **Thalia** diaphragm **Alternating-Single-Use-Pump** (A-SUP) straight or angled version interfaced with the SepraPor HFF – no TRI-clamps or the like
- MBD (Magnetic-Bottom-Drive) or HPD (Head-Plate-Drive) as needed
- 900 mm weldable M-Flex hose connected to SepraPor permeate barb
- 900 mm weldable M-Flex hose connected to unique 25 µm pore glass frit
- Thermal control as needed - electrical or liquid with Magnetic-Bottom-Drive (MBD) or Head-Plate-Drive (HPD) - choose one of these options:
 - Electrical-Heating-Blankets (EHB) (InCyte possible - require EHB attachments)
 - Electrical via Heating-Support-Foot (HSF) (InCyte possible) - see the 3rd photo
 - Liquid RUJ - P-SUBmerged to be inserted into the Re-Useable-Jacket (RUJ) (InCyte not possible)
 - Liquid SUJ - equipped with Single-Use-Jacket (SUJ) (InCyte not possible)

The kit / the package consists of:

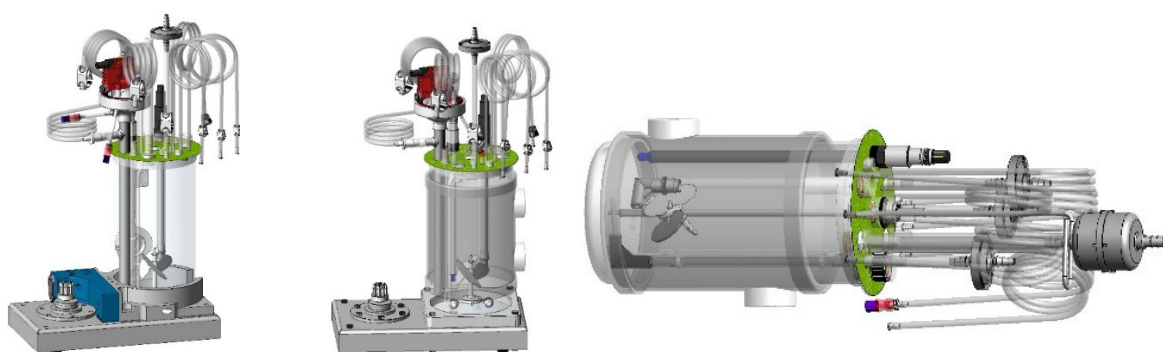
- 0.4 - 2.5 liter Working Volume (WV) from 3.2 liter Vessel Volume (VV) **fully pre-assembled** and ready to install with selectable impeller of which Power Numbers are known
- The CellRetention-3 dual foil bag packed and precision irradiated
- Don't forget to pre-wet HFF as usual – info found here – [Tips&Tricks](#)

Benefits of the P-SUBmerged are:

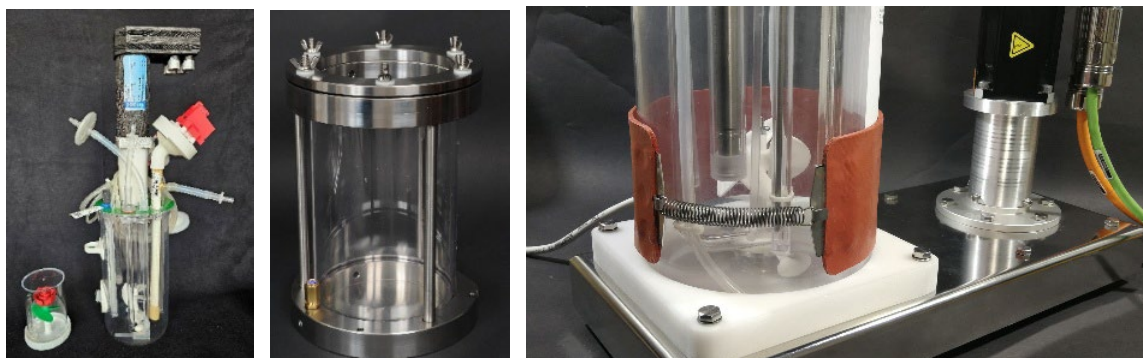
- **avoid HFF fouling** – freedom to select broth velocities for gentle harvest and sequential pulses flushing out debris from inside the HFF
- **eliminate dead volume** – skip all the hoses, traditional plastic connectors and **SUBmerge** the HFF
- **avoid cell death** - inverted Thalia pump arranged on top of the HFF = hereby the diaphragm pump cannot accumulate cells
- **reduce shear force** – protect cells by eliminating hoses, fittings - **SUBmerge** the HFF inside the P-SUB and the inverted Thalia on top of HFF

Installation

- Suitable for a number of PCS (Process-Control-Systems) with variation in hose / peristaltic pumps connections, agitation – check under download the standard variant currently available
- A number of servo motor adaptors are available



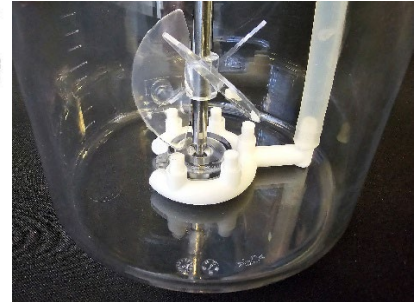
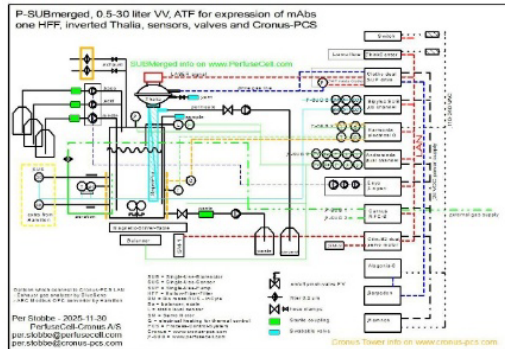
Rendered SolidWorks CAD drawings show different details of the 3 liter P-SUBmerged all 3 driven from bottom. Left P-SUB arranged in the Heating-Support-Foot (HSF) on MST incl InCyte opposite. Center - the 3 liter P-SUB surrounded by the Single-Use-Jacket (SUJ) for liquid thermal control. Right - the P-SUB incl SUJ illustrating how liquid thermal control require liquid inlet at bottom and outlet opposite at top.



If Head-Plate-Drive (HPD) is the desired option – not the safest option for a lightweight P-SUB with a heavy servo motor on top – though if the P-SUBmerged require liquid thermal control balance is obtained. If the P-SUB is inserted into the Re-Useable-Jacket (RUJ) safety

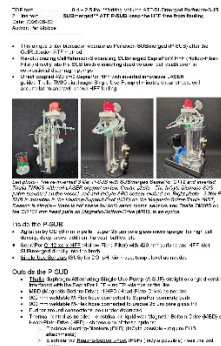
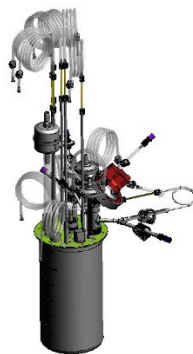
is obtained. The P-SUB mounted in a 15 mm deep mechanical support on MST and wrapped with the 75 x 350 mm EHB.

Find Tips & Tricks here - <https://perfusecell.com/perfusion-support/tips-tricks-in-details/tips-tricks-3-liter/>



FlowChart connects the P-SUBmerged to the more advanced Cronus-PCS running Lucullus SCADA software. Rendered CAD illustrate the 3 liter SUBmerged with straight Thalia for MST drive and with angled Thalia TM80A for HPD drive. Both designed for HSF thermal control allowing InCyte to be installed. Right photo shows latest sparger concept with multiple micro porous glass frits for high KLa numbers arranged under the impeller.

Download documentation - for 3D PDF checkout conditions here - <https://perfusecell.com/download-product-info>



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